


GASTRIC ULCERS



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GASTRIC ULCERS

THEIR SURGICAL TREATMENT

Two Papers

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WITH AN INTRODUCTION
AND WITH BRIEF NOTES OF A CASE OF OPERATION FOR
PERFORATION OF AN ULCER OF THE DUODENUM
AND OF A CASE OF PERFORATION OF
A CANCEROUS STOMACH

BY

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Introductory

A SUFFICIENT justification for reprinting these Papers is that many even of my personal friends have not seen them. They deal with subjects which should be of high interest to all medical men, and with questions some of which are comparatively, and others even absolutely, new to most of us.

Of late years a considerable number of cases of gastric perforation have been operated on, and, more recently, a few of duodenal perforation. Such operations have been repeatedly successful, not only in the large institutions of cities, but also in cottage hospitals. They are operations of emergency, which should be performed not only correctly but promptly. It is a matter of great consequence that, in nearly every case, operation should be performed within twenty-four hours of the perforation occurring, or, especially if there is any considerable escape of stomach contents, within twelve hours.

But it is less generally known, except to specialists, how much benefit operative surgery can confer on obstinate cases of gastric ulcer which have not perforated. I think this kind of gastric surgery may be fairly considered to have begun with Loreta's invention of the plan of treating dilatation of the stomach by stretching the pylorus. Other means of attaining the same end were then contrived, such as pyloro-

plasty by v. Miculicz and gastro-enterostomy by Wölfler. Both v. Miculicz and Wölfler are old pupils and former assistants of Billroth.

There remained to be taken another step destined to immensely develop this department of surgery and widen its field. Talma in Berlin, and Doyen in Paris, came to the conclusion that some form of narrowing of the pylorus, more frequently spasmodic or hypertrophic than cicatricial, is the chief factor in preventing peptic ulcers from healing and in keeping up the associated hyperacidity. This belief has led in a few years to a very extensive use of the operation of gastro-enterostomy, and to a considerable use of that of pyloroplasty, in the treatment of gastric ulcers which have not perforated. Those medical practitioners who have not followed the literature of the subject (and how few are the subjects of which a busy medical man can now follow the literature), would be astonished to learn in how many hundreds upon hundreds of cases the principle of Talma and Doyen and the operations of v. Miculicz and of Wölfler, not to mention Loreta, have been applied. It is needless to add that the operations themselves have been modified by a large number of operators. Perhaps the most noteworthy modification is that in which v. Hacker united the intestinal loop to the posterior wall of the stomach instead of to the anterior. And, of the methods of effecting the union other than one of the almost innumerable varieties of suture, the first to be mentioned should be Murphy's button and the second Robson's bobbin.

The results of this form of surgical activity have been, on the whole, extremely good. The death-rate, in the practice of *experienced* operators, has been reduced to a small one.

Some failures and some relapses occur. But the great majority of cases are now completely successful, and therefore many chronic invalids are restored to complete health and activity.

There is less agreement about the right attitude for surgery to adopt towards cases of gastric hæmorrhage. There has quite recently been, at least in some quarters, a sudden change in the direction of increased activity. My own experience and views are set forth in one of the following papers. I will only add that I believe surgery has been held back by the evil results of operating in the wrong way in cases of gastric hæmorrhage.

Brief notices of (1) *a case of operation for perforation of a duodenal ulcer* which Dr. Andrew Elliot and I had under our care recently and of (2) a case of operation for perforation of a cancerous stomach have been added to the cases previously published in 'The Lancet.' The collective result of the perforation cases is that, of eight operated on by me in the last two or three years, six recovered and two died, in the fatal cases the operation having been performed four days after the perforation, and in the successful cases within about twenty-four hours.



GASTRIC ULCERS

THE SURGICAL TREATMENT OF ULCERS OF THE STOMACH WHICH ARE OR HAVE BEEN COMPLICATED WITH SEVERE HÆMOR- RHAGE

IT is of practical importance to distinguish between severe gastric hæmorrhages and slight ones. In my experience there has so far been not much difficulty in placing individual cases in one or other of these two classes. Severe hæmorrhages are such as show, either by the vomit or by the stool, that pints, if not quarts, of fluid, chiefly blood, have escaped into either the stomach or the duodenum. It seems a comparatively secondary matter whether a given case is gastric, or affects the upper three and a half inches of the duodenum, which are quite accessible during any operation that may be performed to expose the stomach. If we are satisfied that a case is one of severe hæmorrhage from a peptic ulcer, we have made the first essential step. Precise localisation, though desirable, must generally be left to be determined by the operation, if one is performed. If anyone thinks the above preliminary remarks so obvious as to be superfluous, let him read the most interesting debate on Mr. Mayo Robson's recent paper at Edinburgh¹ or Dr. Byrom

¹ *The Scottish Medical and Surgical Journal*, March 1901.

Bramwell's clinical lecture,¹ and he will find in these scarcely any regard paid to the distinction between severe and slight hæmorrhages.

Both severe and slight hæmorrhages have their dangers, remote in the slight cases, immediate and remote in the severe ones. Cases of slight hæmatemesis are not, however, as a rule treated mainly for the hæmatemesis, but on account of the disease of which the blood-stained vomit is a sign. I propose now to deal with three cases of the severe class which have come under my care in the past two years, and also to refer to the case of a personal friend of mine who was not, however, attended by me, but who died abroad. These four form the total of my experience since April 1899, when my interest was first awakened in the subject by my friends, Dr. Leonard Dobson and Dr. James Allan, who had already come to the conclusion that the recent, though past, occurrence of severe hæmorrhage from the stomach indicated a condition requiring surgical treatment.

CASE 1. *Gastric ulcer adherent to the diaphragm and the pancreas, which formed its base. Considerable hæmorrhages, the last nearly fatal; the adhesions separated and the ulcer scraped and sutured; recovery; recurrence of pain; gastro-enterostomy; cure.*—The patient, a female aged twenty years, was anæmic but very well nourished. She had had three attacks of rather severe hæmatemesis, two while in the West London Hospital in October 1898. In one of the latter she vomited a pint and a half of blood. After medical treatment under Dr. F. G. D. Drewitt she went out apparently quite cured, but in spite of careful diet the gastric symptoms returned in a month. She then had another very severe hæmorrhage, and Dr. Dobson, whose patient she was, brought her to the hospital with a view to operation. Her pain was in the epigastrium and between the shoulders. There was a tender spot two inches below the xiphoid, as well as marked tenderness in the left hypochondrium. The special features of the operation (April 14, 1899) were: (1) the position of the ulcer; (2) how it was found; and (3) how it was dealt with. 1. It was near the lesser curvature and œsophageal opening on the posterior surface, and was firmly adherent to the diaphragm and

¹ *The Lancet*, March 9, 1901, p. 687.

the upper edge of the pancreas, which formed its base, as it had completely perforated. It was circular and seven-eighths of an inch in diameter. 2. The search for it was long and difficult. External palpation of the viscus discovered nothing. An opening was made in the anterior wall, and with the finger inside, the first part of the duodenum and all the stomach, except the part nearest the œsophageal opening, were reached and were systematically searched. Then a speculum was used. Lastly, the part where the ulcer proved to be was brought within reach of the tip of the left index finger, by long and very gentle dragging on the posterior wall with the right finger and thumb. 3. The treatment of the ulcer now involved division of the left rectus and prolongation of the median incision upwards to give room, as well as a sufficient perpendicular opening through the omentum into the lesser cavity of the peritoneum. Gauze packing was employed. Careful separation was made of the base of the ulcer from the pancreas and diaphragm; there was an area of thickening here two or three inches in diameter. The ulcer edges were now scraped, which procedure about doubled its diameter. Three silkworm-gut sutures were passed, half an inch apart, through all the coats of the stomach, in such a way that the loops were outside and the ends inside the organ. The original opening in the anterior wall was now utilised in order to tie these three sutures with the knots inside the stomach. Although half an inch apart, they had such a grip on the stomach wall that they seemed to close the hole completely. However, they were now backed up by a row of Lembert's sutures of fine silkworm gut. The anterior gastric opening was then closed by Lembert's sutures. Gauze drains were left in for four days. Uninterrupted recovery followed. Nothing but hot water and a little Apollinaris or lemonade was allowed by the mouth for more than a week. Solid food was not allowed for a month. The highest temperature was 99·5° F. and the lowest 97·6°.

The patient remained well for some months, returning to work in the country. She then began to be troubled with pain and tenderness in the epigastric region again. On Oct. 19th, 1900, a second laparotomy was performed. No adhesions were found, but the lesser cavity of the omentum was not opened. An anterior gastro-enterostomy was done with a Murphy's button. The result so far (November 1902) is apparently perfect, except that no sign of the button has been found either by X rays or otherwise. The patient is following her usual daily work, and she has written: 'I have never felt better in my life.'

It is possible that ulceration recurred in this case, or that adhesions of the site of the old ulcer to the scraped surface of

the diaphragm (or the pancreas) occurred and made the movements of the stomach painful. It is possible that if I had fully dilated the pylorus at the time of the first operation—*i.e.* to an inside circumference of four and a half inches—I might, as in Case 3 (about to be related), have been spared the necessity of a second operation. For the notes of the case I am indebted to Mr. G. F. Briggs and Mr. O. Inchley.

CASE 2. *Severe gastric hæmorrhage; rest and opium and rectal feeding; no operation; death on the twelfth day.*—The patient was a female, aged thirty-two years. I was asked to see her on the morning of September 25, 1899, because, after fainting no less than five times in the preceding twenty-four hours, and passing black stools, she had vomited three or four pints of dark blood or bloody fluid on the evening before. I saw the fluid in a bowl. She had suffered from pain after taking food for a week. I sent her into the West London Hospital, intending to see her again at my usual visit the next day, but as I sent her under a physician into a medical ward, and ‘out of sight is out of mind,’ I forgot all about the case until after the poor girl was dead. According to the note of Mr. T. Wood Hill, the house physician, on September 25, her motions were black. As a rule the patient was constipated, she suffered from headaches, often from faints, and was pale in colour. Her abdomen was ‘resonant, very rigid, extremely tender.’ Rectal feeding was employed and the patient was given ice to suck. One-sixth of a grain of opium was given every six hours. On the 26th the note was: ‘Slept well; melæna this morning; motions fluid, blackish red.’ On the 27th she had slept well and there was no pain in the stomach. On the 28th the pain in the stomach was very severe and the stools were large and dark. On the 29th she was ‘quite comfortable.’ On the 30th three out of seven enemata returned. There was pain in the abdomen and great weakness. The pulse was poor before the enemata. Two-minim doses of solution of strychnine, ‘*si opus sit*,’ were ordered. On October 2, enemata and meat suppositories were given every four hours alternately. The pain was less. The pulse was of poor volume. On the 5th the gastric pain ceased. On the morning of the 7th the patient was suddenly seized with pain. The pulse was rapid and very poor in volume. There was no sickness. At 8 P.M. the pulse at the wrist was imperceptible. Venous transfusion was performed, four pints of saline solution being injected into the median basilic. The temperature afterwards went up suddenly to 106·8° F. and the patient died at 4.25 A.M. No post-mortem

examination was allowed. Brandy had been given both by the mouth and with the enemata (two ounces per twenty-four hours) from September 28, and bismuth mixture from October 4. The temperature chart is interesting. The range was between normal and one degree subnormal until the final rise.

I am sorry to say that I did not remember to inquire about this case until some months had elapsed, when I was grieved to hear the course which things had taken. One question which arises in this case is, Had perforation and localised peritonitis taken place? I do not think so. Dr. E. A. Saunders and I now think that the patient's life might possibly have been saved by operation, and that the second day after her admission into hospital would have been the time to choose in this case. At all events, I did no good by 'trying medical treatment first' and 'waiting for a recurrence of the hæmorrhage.'

CASE 3. *Long history of chronic gastric trouble; severe hæmorrhages; Loreta's operation (pylorus stretched to four and a half inches internal circumference); recovery; quite well up to one year afterwards.*—The patient was a woman, aged thirty-nine years, who had been married for fourteen years and had been a widow for nine years. She had had two children. There was a tuberculous family history (husband and son). She had suffered from indigestion since childhood and from flatulence. Since her husband's death she had worked hard and had suffered more from indigestion. She had had a cough for years. Pain began from one-quarter to half an hour after taking food. Lately the pain had been more delayed and was of a less defined character—a 'sinking, uneasy sensation.' In the preceding March she had a severe attack, vomiting 'some quarts of blood.' In October she brought up more blood. This patient, like the first, was also placed under my care for operation by Dr. Leonard Dobson. She took liquid and light food well after admission and improved in appearance. The operation was carried out on April 20. The patient had been prepared for several days by purgatives and enemata. A median epigastric incision was made. The pylorus was found to be very hard and thickened. It would not admit the tip of the little finger and it felt quite rigid. No ulcer was seen or felt; but it was not thought fair to the patient to add to her risk by making a prolonged and rigid search for ulcer. A Loreta's operation was decided upon, as I

had previously seen an excellent and lasting result follow this operation when performed on a similar pylorus. Through a small opening in the anterior stomach wall a three-bladed anal dilator was passed through the pylorus until the blades were wholly inside the stomach and duodenum : thirty-seven turns of the screw, made very gradually, dilated the pylorus to an inside circumference of four and a half inches. The wound in the stomach wall was closed by three sutures penetrating *all* the coats and tied with their knots inside the lumen, and by a superimposed row of twelve Lembert's sutures. Two small drains were carried obliquely from the parietal wound to near the stomach wound and they were removed in a few days. Some ether sickness occurred during the night. On the 22nd the patient vomited once and on the 23rd once. On the 26th she was very hungry. There are no other notes. Convalescence was rapid and uninterrupted. She was fed for a week on beef-tea by the mouth (half an ounce every two hours, after vomiting had ceased), and peptonised milk enemata containing plasmon. A week after the operation she also took by the mouth one drachm of milk every two hours, with plasmon, one drachm to four ounces of milk, and afterwards milk-and-soda and Benger's food, and on May 1, mutton, fish, &c. She went out well on May 26 and has remained well. At Christmas she wrote, 'I can now take quite ordinary food and have no signs of indigestion.' The notes of the case were kindly supplied by Dr. Maurice Dee.

CASE 4. *Duodenal ulcer; perforation of pancreatico-duodenal artery; hæmatemesis and melæna; no operation; death.*—A military officer, aged forty years, was taken into hospital with a history of severe recent hæmatemesis and melæna. He had just arrived at this place (in India) after a long journey. He had fainted while walking across the room with a glass in his hand. He had only just returned from leave in England, where he had been under treatment for a pain which came on regularly about an hour after retiring to bed—*i.e.* about the time a late dinner would be passing into the duodenum. Gastric trouble was recognised, but a precise diagnosis was not made, and in England the patient was relieved by treatment. In India the liver was suspected. He was placed on a milk diet when taken into hospital, but he died the next day. *Post mortem* an ulcer of the duodenum was found, perforating the pancreatico-duodenal artery. There were circumstances of special difficulty attending the diagnosis and treatment of this case, which progressed chiefly during the long journey from England to India. This life was one of the highest value not only to the patient's relatives but to his country. For the details of the case I am indebted to my friend and

old house surgeon, Mr. H. G. Wharry. In India the patient was under the care of another old house surgeon of mine, an exceedingly able and painstaking man. The patient's family are intimate friends of mine, and an old patient of mine lay in the next bed in the Indian hospital. This case was thus brought under my notice in four distinct ways.

Assuming that it is right for surgery to act in cases of severe gastric hæmorrhage, the first questions which arise are *when* and *how*. It is natural to turn for guidance to the experience of Billroth and his assistants, the latter still living and working with enthusiasm and with brilliance comparable to those of their great master. This school founded modern gastric surgery, and has had a large share in its further development. Von Miculicz of Breslau gives a gloomy account of the result of operating during the progress of acute hæmorrhage. Only two patients had recovered out of a considerable number—one of Roux's and one of his own. He himself had lost three. Mr. Mayo Robson has had a successful case—that of a woman who was operated upon on July 6, 1900. Seven bleeding points were found. Two were ligatured *en masse* and the other five stopped 'on exposure to air.' Posterior gastro-enterostomy with bone bobbin was performed. There is another successful case just reported by Dr. Brunton Angus.¹ The patient was attacked by venous thrombosis in both legs about a fortnight after the operation. The ulcer was ligatured *en masse*. Many other cases will soon be reported as a result of the attention which is now being directed to the subject, and possibly not a few failures will be passed over in modest silence.

Now death from gastric hæmorrhage is nearly always death from *recurrent* hæmorrhage. Further, there is no need to operate quickly in order to avert peritonitis as in cases of perforation; and the patient is usually alarmed and depressed to fainting during the bleeding. Lastly, a day or two usually

¹ *Brit. Med. Journ.*, March 23, 1901.

intervene between successive hæmorrhages. These considerations would lead one to defer operation until actually present hæmorrhage had ceased and shock had passed away. But one must not expect reaction after large hæmorrhages to restore to the pulse its original strength and volume. When the patient has fairly rallied and his or her extremities have become warm, with or without external heating appliances, if operation is decided on the sooner it is done the less will be the risk of being overtaken by another (and possibly fatal) bleeding.

The next consideration is the *mode* of operating. It must be remembered that while the gastric ulcers which perforate and cause peritonitis are nearly all on the anterior wall, those which perforate and bleed are, in a large proportion, on the posterior wall, and especially such as adhere by their bases to the pancreas or to its near neighbourhood. Therefore, when these latter have been exposed by operation, it has generally been found difficult simply to take up the bleeding point and to tie it securely. Resort has been had either to ligature of the ulcer *en masse* or to the actual cautery, and the result has been disastrous.¹ I am inclined to think that I was fully justified in my case in preferring to separate the adhesions of the stomach to the pancreas and diaphragm, scrape the ulcer, and close the resulting gastric wound by suture. This was, as I have said, a long process, but if a patient is in fairly

¹ Von Miculicz writes that, besides his successful case, 'I have opened the stomach three times for acute hæmorrhage. The ulcer lay in the neighbourhood of the pylorus in the posterior wall and adhered in two of the cases to the substance of the pancreas. The base and surroundings of the ulcer were so much infiltrated that securing the vessel with a ligature or with a suture was out of the question. I was satisfied with applying the thermo-cautery to the base of the ulcer. The patients died, in the course of the next twenty-four or forty-eight hours, of collapse. Billroth and other operators had no better results in similar cases.' Körte of Berlin, in the discussion after von Miculicz's paper, described a similar case of his own. After the cauterisation the bleeding continued till death occurred eight days afterwards. The artery eroded was found, post mortem, to be the splenic. In a publication dated 1900, von Miculicz does not modify his opinion or add to the above facts.

good condition, is kept warm, is not allowed to bleed, and is not over-dosed with anæsthetic, and if also the vigilance of the antiseptic precautions is not allowed to relax, I do not believe that a moderate prolongation of an operation seriously endangers its success. But I hold it to be of the first consequence, especially with feeble subjects, to produce only so much anæsthesia as is necessary to protect the patient from serious pain. The dose should not be increased as a luxury for the surgeon. I do not recommend separation of a bleeding ulcer from the pancreas or the diaphragm as a routine procedure, because I think shorter and easier measures will generally suffice.

In these days the old general rule of surgery to cut down upon a bleeding vessel and to tie it is modified by many exceptions, especially in parts where compression can be applied. Unfortunately, compression is seldom if ever applicable to gastric hæmorrhages. Even temporary pressure by forceps should not be relied upon to permanently check bleeding from the vessels of the stomach. Experience of gastric operations proves that, where practicable, a ligature should be put on before removing the forceps. Not only has it often proved difficult to find the bleeding point or points in operations for gastric hæmorrhage, but also, when found, the source of bleeding has sometimes proved so friable or in such a situation that effective ligature, even *en masse*, has not been possible. And, as I have already said, the cautery has not given good results. There remain, however, at least three other powerful agents which may be used in nearly every part of the body as protective against recurrent hæmorrhage, viz.: (1) rest (local and general), (2) aseptic measures, and (3) gauze (especially iodoform gauze) packing. The first two can be used more or less successfully by the physician, but they can be effected more thoroughly and more lastingly by the surgeon, and the third, of course, can only be employed by the surgeon.

It is well known that the arrest of bleeding from an eroded vessel in the stomach is brought about by the formation of a clot in it. It is often assumed when the bleeding recommences that some excitement of the circulation has displaced the clot. From what takes place in regions of the body more open to observation I should infer that usually not mechanical displacement but septic disintegration has been the chief agent in starting the bleeding afresh. What a difference there is in the value of plugging in the present as compared with the past! That difference is mainly due to the fact that formerly a septic wound used to be plugged with septic material, while now an aseptic wound is plugged with aseptic or with antiseptic material. No doubt the secretions of the stomach, especially of the normal stomach, have a bactericidal power, but examinations of matters vomited show that power to be limited. In a case of recent severe hæmatemesis there is a stomach containing blood and perhaps food at the temperature of the body and in contact with a diseased area, the ulcer, and with a mucous membrane not secreting normally.

The stomach can be washed out through the gullet, and some medical men recommend hot-water lavage for cases of hæmatemesis. It is rather a disturbing process, but I should hesitate to condemn it on mere *a priori* grounds. Indeed I have lately used it satisfactorily in a case of hæmatemesis secondary to strangulated hernia, finally leaving in a hot solution of suprarenal extract. An objection to it is that if the asepticity of the stomach is to be preserved the lavage must be frequently repeated, and in many patients it can only become a gentle process when the patient has been long accustomed to it. There is also a slight risk of perforating a diseased stomach. And what if the diagnosis were wrong and the stomach already perforated!

If a stomach is opened and cleansed by the surgeon, how is the cleansing or asepticising to be made permanent or

at least enduring? A very extensive experience by various surgeons agrees that if, by a successful gastro-enterostomy or pyloroplasty, or even mere dilatation of the pylorus, we remove all spasmodic or other obstruction to the free flow of stomach contents into the small intestine, a great and a rapid improvement takes place in the health of the stomach. Indigestion ceases and ulcers heal. In ordinary cases, therefore, one of these operations alone would suffice. Mr. Caird recommends the performance of a gastrostomy as a mode of giving rest to the stomach, and regards such a procedure as analogous to one for drainage of a diseased urinary bladder. Mr. M'Gillivray points out an essential difference: urine is always flowing into the latter, but we are not obliged to be always putting food into the stomach. Moreover, Mr. Caird suggests that the gastrostomy should be done by Witzel's method. The calibre of the small rubber drain or catheter generally used in Witzel's gastrostomy compares unfavourably for drainage with the one-and-a-half-inch or two-inch diameter of a gastro-enterostomy wound.

A question with a practical bearing is *how* do gastro-enterostomy, pyloroplasty, and Loreta's operation come to act so beneficially on peptic ulcers? The explanation generally adopted is that they prevent stasis of the stomach contents due to constriction of the pylorus. But duodenal ulcers lie beyond the pylorus altogether, and peptic ulcers are found up to, but not beyond, where bile and pancreatic juice enter the duodenum. It is reasonable to infer that the presence of these juices is a protection against gastric ulcer. We were, most of us, I think, until recently under the impression that much bile in the stomach would cause discomfort and probably vomiting. A remarkable case is reported by Mr. B. G. A. Moynihan.¹ After an accident which completely separated the duodenum from the jejunum, that surgeon closed the distal end of the duodenum and did a

¹ *Brit. Med. Journ.* vol. ii. 1900, p. 1403, and more fully on May 11, 1901.

gastro-jejunostomy. All the secretions of both the liver and pancreas now necessarily only reached the intestine by flowing backwards through the stomach. The patient lived for two months in 'perfect health.' Death then resulted from perforation caused by the Murphy's button which had lodged in the cul-de-sac caused by closing the end of the duodenum.

I suggest that the curative effect of gastro-enterostomy, &c., is due in some measure to the passage of bile and pancreatic juice into the stomach. My colleague, Mr. L. A. Bidwell, tells me, as supporting this suggestion, that traces of bile can be found in the stomach contents after gastro-enterostomy.

To return for a moment to Mr. Caird's suggestion already referred to, no mere gastrostomy would bring bile into the stomach. Still, it must be admitted that a sufficiently *large* gastrostomy opening would permit frequent and complete lavage of the stomach through it, and the patient could assist this by swallowing copious draughts of hot water—an act which would be very grateful to him and tend to remove one of the sources of distress which patients fed wholly by the rectum have to endure. I, therefore, think that a simple direct gastrostomy wound, large enough to admit the finger, might have been good practice in such a case as that of the patient in Case 2 *supra*; and that if performed on the day after her admission into hospital it would have saved her life, especially if the pylorus had been well dilated at the same time. During the operation a quick search for the bleeding point might have been successful, but a prolonged search would not have been justified considering her state. The proper anæsthetic would have been gas with oxygen. I have tried it for gastrostomy and can strongly recommend it. Mr. R. W. Lloyd was the administrator. It has the great advantage of not being followed by vomiting.

If there is anything in the hypothesis that the cure of peptic ulcers by certain operations is due partly to regurgita-

tion of the secretions of the liver and pancreas, it would be reasonable to treat gastric ulcers by administering orally preparations of those secretions, or perhaps of the fresh glands themselves; and all the more so, because even the hypertrophy and contraction of the pylorus often present with gastric ulcer—*e.g.* in Case 3—are probably of reflex and irritative origin. The ulcer, the hyperacidity, the pyloric contraction opposing the stomach movements, and at least one other as yet unknown cause, probably bacterial, act and react to exaggerate each other. Attack one or two of these successfully and the rest are weakened. Get the ulcers into a healing state, and it is likely that the pyloric contraction, unless cicatricial, will abate. This is one of several reasons why I respectfully differ from those who altogether discard Loreta's operation. But 'that is another story.'

It is possible that some readers, bearing in mind that I am only a surgeon, may think that I have formed an exaggerated idea of the seriousness of gastric hæmorrhage from only hearing of very severe cases. In truth, I am brought into contact with many cases of lateral curvature of the spine which have a history of present or past symptoms of gastric ulcer and slight hæmatemesis.

There remains for consideration not so much the value as the applicability of iodoform-gauze packing. The objection usually urged to it is that a gastrostomy opening would have to be left for its removal. But such an opening as I have endeavoured to show, in partial agreement with Mr. Caird, might not be an unmixed evil. Or a small piece of gauze could be left in the stomach to pass per anum when free or even pulled up by a silk ligature passed through the œsophagus and left there till wanted. The gauze could be fixed against the bleeding surface by catgut sutures attached to neighbouring points of the stomach wall (mucosa and submucosa). Every case must, of course, be considered on its own merits, and in the present state of our knowledge decision must often

be difficult, both to the physician who does justice to surgery and to the surgeon who acknowledges, as he must, that gastric hæmorrhage treated medically does not, as a rule, prove fatal, even if severe, and that such operations as gastro-enterostomy and the excision of gastric ulcer are themselves not free from danger. But the dangers of gastro-enterostomy diminish with increasing experience of the individual operator, and with the general advance of gastric surgery. Murphy's button is most likely the best means of performing gastro-enterostomy, especially for the use of the operator who is deficient in general experience. The one objection to it is its tendency to fall back into the stomach or to stick in the opening instead of passing on through the intestine ; both these accidents have occurred to me, but they were easily dealt with. It is a quick mode of operating, but it should not be applied in a hurry. I suspect that many failures attributed to it have been really due to want of care and deliberation in placing, adjusting, and fixing it and the margin of the two wounds it has to keep in contact, and in some cases to faulty construction of the button.

A collection of seventy-five operations done in various ways by Billroth, von Hacker, Czerny, and von Miculicz, made by the last-named, showed the following decreasing percentages of mortality. The operations were for non-malignant stricture of the pylorus and for gastric ulcer ' without severe complication ' :—To the end of 1886, 62·5 per cent. ; 1887 to 1890, 42·1 per cent. ; 1891 to 1894, 22·2 per cent. ; 1895 to the beginning of 1897, 10 per cent. Von Miculicz gives the following decreasing mortality percentages for the individual operations, the periods compared being before the end of 1890 with 1891–97 :—Resection, 39·3 per cent., reduced to 27·8 per cent. ; gastro-enterostomy, 43·5 per cent., reduced to 16·2 per cent. ; pyloroplasty, 23·8 per cent., reduced to 13·2 per cent. These figures are calculated from a total of

234 cases, collected from various sources. There can be no doubt that increased personal experience in the selection of cases, in the choice of operation and in the mode of operating, and increased practice in gastric surgery are capable of further reducing the death-rate, and, indeed, they seem to have already done so.

With regard to the degree of danger of gastric ulcer in general when treated medically, I think that those physicians who speak of having treated so many hundreds of cases with, say, 95 or 98 per cent. or even 100 per cent. of recoveries, are not giving their experience quite correctly. I suspect that inquiry would show that many of these cases had not been under the observation of these physicians for more than a few months, whereas gastric ulcer goes on, or keeps recurring only too frequently, for years. My patient in Case 3 had had gastric symptoms for twenty-five years, which represent about 150 of what some people seem to call 'cases.'

I think the statistics advanced to prove Loreta's operation to be no safer than gastro-enterostomy must be fallacious. Loreta's operation went out of fashion at a time when all these gastric operations were more dangerous than they are now. It is certainly free from one of the serious complications of gastro-enterostomy—viz. the danger of the so-called 'vicious circle,' the passage of the stomach contents, not into the efferent loop of intestine, but into the afferent and so backwards through the duodenum into the stomach. The use of Murphy's button seems to protect against this complication of gastro-enterostomy. Why should mere dilatation of the non-cicatrised pylorus be dangerous? True, it involves a gastrostomy unless done by invaginating the stomach wall on the finger. But a mere gastrostomy is a very safe procedure, as is proved by surgical experience in the removal of foreign bodies. But in favour of gastro-enterostomy remains this possibility, that it may be more likely to give a permanent cure of the ulcer itself and of the chronic gastric catarrh. Of

course, a pyloroplasty can effect every object attainable by Loreta's operation, but it must be a more serious procedure except in the case of a cicatrised pylorus so rigid that it would be dangerous to stretch, and then a pyloroplasty might not be applicable.

One of the strongest arguments in favour of surgical treatment of gastric cases which have bled severely is that it generally gives permanent health to the stomach.

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THE SURGERY OF NON-MALIGNANT GASTRIC ULCER AND PERFORATION

THE following notes are rather detailed. Experience of detail is exactly what I have felt the need of when commencing non-malignant gastric surgery. Some of the cases are of exceptional interest, otherwise they would not have come under the surgeon's notice, as they are derived from sources most of which had not at the time realised how much surgery can do for commonplace cases of obstinate gastric trouble. The cases here reported are not selected, but with those of 'severe gastric hæmorrhage,' reported in 'The Lancet' in June 1901,¹ with three cases of ulceration of the stomach and œsophagus from hydrochloric-acid poisoning, which form the subject of a paper read before the Royal Medical and Chirurgical Society,² and with a case of tetany of gastric origin briefly noticed in 'The Lancet,'³ they form a complete, though small, series of 23 non-malignant gastric cases. Most were operated on—a few were not. Remarks are appended to some of the cases individually. The general observations may be divided into (1) those on perforation cases ; and (2) those in which evidence of perforation was wanting or very inconclusive.

PERFORATION

Precision or certainty in diagnosis is, in most cases of gastric perforation, not possible, even to experienced persons

The Lancet, June 8, 1901, p. 1597. ² *Ibid.* Nov. 17, 1901, p. 1328.

³ *Ibid.* Jan. 22, 1901, p. 1788.

But it is not necessary. The medical man who waits for a case in which the peritoneal cavity is obviously distended with gas, obliterating the liver dulness, while the vomit contains blood, while excruciating pain and tenderness are localised in the stomach region, and there is a known previous history of gastric ulcer, with hyperacidity, hæmatemesis, epigastric tenderness, pain after meals, and dilatation of the stomach, may expect to become responsible for such melancholy cases as Case 7 and Case 8 detailed hereafter.

Quite a small number of the above symptoms should suffice to excite grave suspicions if they come on suddenly, and they need not be at all well-marked. If, then, the physician or practitioner cannot make up his mind as to what has happened, that uncertainty is not an indication for waiting but for immediately calling in the surgeon. The surgeon then shares the responsibility, and a grave and difficult one it often must be, especially if the case is far away in the country and 'now or never' is the time for decision. The cases here recorded tend to show that it is best to settle the question of diagnosis by an immediate exploratory operation. Compare, for example, the results in Cases 1, 2, 3, 4, 5, and 6, with the results in Cases 7 and 8.

Sudden and severe abdominal pain with faintness and with or without vomiting is an ominous symptom in either women or men, especially if there is anæmia with a history suggestive of chronic indigestion. Note that in Case 2 there was absolutely no abdominal tenderness, no vomiting, and little pain or distension. Yet there was a gastric perforation, while the pus and lymph in the pelvis and elsewhere showed that the case was fully started on the course which led the patients in Cases 7, 8, and 10 to the grave, and the subject of Case 11 into a condition of chronic invalidism.

With due care, gentleness, and experience an exploratory laparotomy becomes a simple and safe affair. If a large hole be made in the abdomen, the arm thrust in half-way up to

the elbow, and the hand carried round and round all over the viscera from the diaphragm to Douglas's pouch, a patient may be made alarmingly ill by it, especially if strict asepsis is not secured. But any procedure so rough as this is very rarely, if ever, necessary. Almost always a shrewd guess at localisation can be made before incision, and generally the pylorus or the cæcum, or whatever has to be dealt with, can easily be drawn outside, and the neighbourhood explored with two or three fingers.

One of the first rules in all doubtful cases is, 'Do not feed by the mouth.' And do not be in a hurry to leave off rectal feeding. In Case 10, the patient who refused to be operated on was at first in a favourable position because so many hours had elapsed between the time of the perforation and that of the last meal, but three or four days afterwards, when she had ceased to be under my care, oral feeding was recommenced. This may have contributed to bring about the fatal termination.

After operation, especially if Murphy's button be used and the patient is very low and not vomiting, liquid food may be allowed by the mouth very early, or even immediately. As vomiting would prevent this, very little general anæsthetic should be given, and that only during the really painful part of the operation. If ether or chloroform is being given, the mask or other appliance should be taken off the mouth as soon as the stomach is brought out, and not reapplied till the need for it is apparent. The surgeon ought to be allowed to *see* that the anæsthetic is not being given. Even if the patient soon vomits a little no great inconvenience is caused to the operator who has a reasonably good assistant. In the value of ether or any other drug 'as a stimulant' during operation I do not myself believe. Let the patient be kept warm, the blood-vessels full, and the breathing free, and no stimulant will be needed. If these are neglected no stimulant is any good. After operation for perforation it is better to

give only hot water, in half-ounce doses hourly by the mouth, for several days, and peptonised milk enemata, four ounces every four hours, with occasionally a 10- or 20-ounce enema of hot water to relieve the thirst or to strengthen the pulse. Plasmon is useful (one drachm to four ounces of milk). Opium is a great reliever of pain, but even as an anodyne it is a good deal less effective than correct surgical treatment, which it often fatally obstructs and hampers. I rarely give it. Large doses are bad, and small ones are generally either ineffective or not necessary. Both large and small doses are apt to lull into a false feeling of security. This fault was conspicuous in several of these cases.

The precise nature of the illness of the patient in Case 7 was never determined. There may have been, even at first, hæmorrhage, but, in spite of her sex, I think that it was more probably perforation of a duodenal ulcer, localised peritonitis, improvement for 10 days, and finally severe hæmorrhage due to erosion or sloughing of some considerable vessel, and death. It shows how insufficient even strict rectal feeding and rest may prove even in a most favourable case. Perhaps a timely gastro-enterostomy would have saved this patient.

One of the dangers of delay and of not applying surgery until a case is in a depressed and bad condition is that operation is then liable to be hurried, and essentials may be thus overlooked. The pelvis was not explored and cleansed in Case 7. The pelvic peritoneum should always be examined, and, if necessary, cleansed, even when the peritonitis or perforation is in the upper half of the abdomen. The converse is not absolutely true. I mean it is not always desirable to examine the perihepatic peritoneal spaces when peritonitis has begun in the pelvis or about the appendix, but some lives are lost even through this not being done. Case 8 was in too desperate a condition for much surgery, and the fact that the prime focus of mischief was behind the stomach, through the foramen of Winslow, was not discovered till after death. I

think it would have been quickly found at the operation had the surgeon been called in before the suppurative peritonitis was universal.¹

Just as several of these cases show clearly the evil of delay and of waiting for death and a diagnosis to arrive together, sometimes treading close on the heels of surgery applied too late, so clearly is great credit due to the promptitude, knowledge, and acumen of Dr. A. H. W. Clemow, Dr. Otto Grünbaum, Dr. D. Fairweather, Dr. H. Lawson, Dr. Bailey, and Dr. Andrew Elliot, to which the patients in Cases 1, 2, 3, 4, 5 and 6 owe their lives.

As in Case 1 the rupture did not take place through an ulcer, but only in, or close to, a cicatrix, and as it was not the result of external violence, I think it comes under the classification of 'spontaneous rupture of the stomach.'

Although in Case 2 the lower limit of liver dulness was only pushed up about two centimetres above the edge of the rib cartilages, and even that was caused by air in the greatly distended transverse colon rather than by the small quantity of gas free in the peritoneal cavity, Dr. Grünbaum rightly attached great weight to the symptom. Diagnosis in this case was further complicated by the nervous and hysterical state of the patient. She had no abdominal tenderness.

In Case 13, that of the infant who was shot through the liver and stomach and who died on the eighth day, there are several obvious points which recall the case of President McKinley. This unfortunate child, age 14 months, was handicapped by (1) marked rickets; (2) whooping-cough; and (3) a burn to the bone on the right heel. I regret now not having excised the whole of the bruised and extruded omentum. It was, however, carefully cleaned, not only by

¹ Kingston Barton writes: 'If there is delay the symptoms become more general and less clear, and the surgeon himself fails to recognise the necessity of immediate operation. Several of my cases sent to hospital were lost for this reason' (*Records from General Practice*, vol. i. p. 7).

us, but by Mr. H. W. Chambers of Goldhawk-road, who sent the patient into hospital so promptly. The oblique incision parallel to the edge of the rib cartilages proved admirable for exposing the whole stomach and even the spleen.

The patient in Case 7 had parotitis after operation for perforation performed on the fifth day. This case was also remarkable on account of the second perforation, which I am certain followed the laparotomy performed for the first perforation, and polluted the sutures which lay near it, thus destroying what little chance of life this case possessed.

Sub-diaphragmatic Abscess.—Cases 11 and 12 illustrate the long and dangerous period of chronic invalidism which may ensue even if a case of gastric perforation which is not operated on escapes the immediate danger to life.

NON-PERFORATIVE CASES

In the first part of this pamphlet I have published four of these cases in which severe hæmorrhage occurred. Case 9 in this series ought really to have been published with those four, but it was forgotten, probably because it was not operated on. With regard to Case 14 the result may be traced, I think, to several causes. 1. To the overloading of the whole colon with masses of fæces, which overloading was due partly to the prolonged previous use of opium and partly to insufficient preparation of the patient before operation. It is quite possible that the persistent vomiting which had lasted for five weeks daily was itself partly caused by the opium and constipation. 2. To the close continuous glover's suture with which I sutured the edges of mucous membrane together. Abscess between the layers of the stomach wall occurred, and the suture in question must have tended to prevent the discharge of the pus into the gastro-intestinal canal. I know of two other similar cases in the practice of surgeons who suture the mucous edges together.

When suppuration threatens beneath the skin, we can often prevent it by removing sutures, but an analogous practice is impossible in the stomach. This Case 8 is interesting as having been apparently one of capillary hæmorrhage, as no ulceration was discovered even *post mortem*. The patient in one case had in the course of five years been twice 'cured' by rest in bed and a milk diet, the cure once lasting for a whole year. In connection with this case a few words may be said about Murphy's button.

Murphy's Button.—Gastro-enterostomy by this means is, as von Miculicz and others point out, singularly free from the risk of the 'circulus vitiosus' or persistent regurgitation into the wrong arm of the jejunal loop and so back into the stomach and round and round. Murphy's button seems to me to have other advantages. It keeps together broad surfaces of the two parts to be united. It keeps them uniformly together if carefully applied. It runs no risk of a weak point where one suture has not been put in so carefully as its neighbours or where one suture is exposed to undue strain. It is an obvious protection against recurrent hæmorrhage, a real danger in gastric operations. Further, it protects the parts of both stomach and intestine beyond its circumference from septic infection, just as a ligature round a finger would keep snake venom out of the general circulation. The speed with which it can be applied is a secondary consideration; indeed, I suspect that it tends to discredit the button, because it leads to its being selected for specially bad cases, and also leads to its being put in hurriedly. No hurry should be used; on the contrary, great care and precision are indicated in (1) adjusting the cut edges of the inner serous aperture to the central cylinder of the button, turning in all mucous membrane; (2) in putting in and tying the two or three silk sutures which finally reduce the size of the aperture; and (3) in bringing the two parts of the button correctly together and gradually closing them until the two serous

surfaces are in absolutely close contact *all round* the button and slightly compressed together.

The chief drawback to the use of the button is its liability in gastric cases to fall back into the stomach, or even, it is said, into the wrong part of the jejunal loop. The former accident has happened to me twice, and once also the button remained for several weeks fixed in the gastro-enterostomy opening (in a case of hydrochloric-acid poisoning not in this series). In the latter case I had not pressed the halves of the button tightly enough together. In these cases the button was easily localised with the X rays and as easily removed. Even before the advent of antiseptics and long before surgeons were as accustomed as they now are to gastric surgery, gastrotomy for the removal of a foreign body was a very safe operation.

It has recently been said that 'it is difficult to imagine anything more likely to irritate the ulcer than a Murphy's button being continually churned against it.' The question is not one of imagination at all, but of experience, which shows that the use of the button permits the ulcer to heal rapidly. And why not? Murphy's button is not a solid chunk of cast iron, rough and angular, but is a hollow, light, rounded and polished ring of thin sheet metal. With regard to 'churning,' the stomach is a muscular organ, and when, thanks to a successful gastro-enterostomy, it has acquired the power of emptying itself with ease, it grasps its contents and moves them on in an orderly and quiet manner. I am reminded of an objection urged by the late Mr. Adams of Bungay against lithotripsy—that it 'turned a man's bladder into a gravel-pit.'

The knob of each half of the button can be introduced through a surprisingly small cut in either the stomach or the intestine, a cut shorter than the diameter of the knob. An assistant should hold two points of the cut edge with catch forceps; the surgeon should then seize another point with

dissecting forceps. The opening thus becomes triangular, and through it the button knob, gripped by the edge with the tip of a pair of catch forceps, should be gently rotated and persuaded to pass in. The forceps which grips the button should then be handed to the assistant, while the surgeon puts in a couple of fine silk sutures through the 'sero-muscularis' to tighten up. The substitution of these interrupted sutures for a running suture all round the button is, so far as I know, due to Carle and Fantino. Each button should be examined, tested, and found in good order as regards the spring and catches. But for this precaution I should on one occasion have used a defective button. In searching for a retained button with the X rays it is necessary to turn such patients as are not very thin on their faces. The button then falls forward close to the anterior abdominal wall, against which the screen should be placed.

A TABLE BY WHICH THIS SMALL SERIES OF 24 CASES MAY BE ANALYSED INTO 11 DISTINCT VARIETIES

Variety and No. of case		Operated on or not	Recovered or died	
I. 1	Perforation operated on as such (Cases 1, 2, 3, and 4). Case 4 also operated on recently for adhesions	Operation	Recovered	Case 1 was a 'spontaneous' rupture of the stomach.
2		"	"	Each operated on from 24 to 30 hours after the perforation.
3		"	"	
4		"	"	
5	Duodenal perforation. <i>Vide</i> supplement	"	"	—
6	Gastric perforation. <i>Vide</i> supplement	"	"	—
II. 7	Perforations operated on as cases of general septic peritonitis: two cases, each at least four days after perforation (Cases 7 and 8)	"	Died	Death partly due to a second perforation after operation on the first.
8				
III. 9	Perforations not operated on (Cases 9 and 10)	No operation	"	—
10		"	"	—

Variety and No. of case		Operated on or not	Recovered or died	
IV. 11	First seen as subphrenic abscess (Cases 11 and 12)	Operation	Recovered	—
12		No operation	"	Still imperfectly recovered.
V. 13	Revolver-shot wound of the stomach and the liver with extrusion of omentum (Case 13)	Operation	Died	—
VI. 14	Persistent capillary (?) hæmatemesis (Case 14)	"	"	—
VII. 15	Acute severe hæmorrhage (Case 15)	"	Recovered	—
VIII. 16	Old history of ulcer and very severe hæmorrhage, gastric dilatation. Tetany; death before there was time to summon a surgeon (Case 16)	No operation	Died	Surgeon arrived after death.
IX. 17	Ulcer several times relapsed after dietetic treatment in hospital (Case 17)	Operation	Recovered	—
X. 18	The three cases of hydrochloric-acid poisoning	Operation	Recovered	Much better for gastro-enterostomy, but died nearly two months afterwards from progressive ulceration of the œsophagus and direct infection of the lung.
19		"	"	
20		No operation	Died	
XI. 21	The four severe hæmorrhage cases ¹	Operation	Recovered	—
22		"	"	—
23		No operation	Died	—
24		"	"	—

¹ See *The Lancet*, June 8, 1901, p. 1597.

Thus, of the seventeen cases operated on, thirteen patients recovered and four died. Of the seven cases not operated on,

six patients died, and the sole survivor is still more or less an invalid. Of the four fatal operated cases, two were of general septic peritonitis operated on four days after perforation; one was that of the infant shot through the liver and stomach, and one patient alone could be fairly said to have died from operation. On the seventeen patients who were operated on twenty laparotomies were done.

It now remains to describe in detail such of the cases as are not reported elsewhere.

CASE 1.—*So-called 'spontaneous' rupture of the stomach; excision of the strictured pylorus and the adjacent part of the stomach, which was the site of the rupture, three and a half hours afterwards; recovery.*—The patient, a man, aged forty-two years, when admitted on December 15, 1899, was suffering from severe pain in the epigastrium. The pulse was good, but the respirations were rather rapid. The abdomen was moving slightly with breathing, but it was tender all over, especially in the region of the stomach. Liver dulness was present. The patient has suffered from 'indigestion' for months, with attacks of vomiting, but he has never brought up blood. He had, however, passed dark-coloured motions (melæna?) and he suffered from piles. At noon on the day of admission, when lifting something heavy, the patient was seized with a momentary sharp pain in the epigastrium and severe vomiting. He walked indoors and drank some bovril. The pain then became excruciating, and it spread all over the abdomen. Dr. A. H. W. Clemow saw him and, diagnosing gastric perforation, gave a quarter of a grain of morphia hypodermically and sent the patient into hospital for operation. Mr. Keetley saw the case at 3.30 P.M. and operated immediately.

Operation.—A four-inch epigastric incision parallel to, and to the left of, the middle line exposed the stomach, which showed a transverse tear three-quarters of an inch long on the anterior surface close to the pylorus, which was itself evidently cicatricially contracted. There was a considerable amount of fluid in the peritoneal cavity (probably bovril, mucus, and serum). The pylorus was slit up longitudinally, when its lumen was found to be narrowed to one-quarter of an inch in diameter. There was no ulceration, but cicatricial tissue had taken the place of the muscular coat. Partly because this had led to the rupture and partly because of the possibility of its being malignant, it was resolved to excise the pylorus. No enlarged or hard glands were discoverable. The part torn was not obviously diseased at all. The stomach was emptied by passing a rubber

tube through the rent and was then handed to an assistant. A temporary rubber tube was passed round the duodenum. Excision was performed freely on the stomach side so that the gastric opening was larger than the duodenal. Its superfluous part was sutured up and the remainder was united to the duodenum by interrupted fine silk sutures (sero-muscular only). Before the suturing the abdominal cavity was dried and cleansed by swabs and all its recesses were douched out with hot neutral saline, chiefly by means of a tube passed in through a hypogastric counter-opening. A large drainage-tube was left in the counter-opening in the right loin and shortened from time to time until at last it was removed.

Recovery was uneventful. There was no rise of temperature except on the eighteenth day and again on the twentieth day. The patient was discharged five weeks after admission, and was seen to be in good health some months afterwards. The patient was shown at the West London Medico-Chirurgical Society. (The notes are by Dr. J. Matthews Duncan.)

CASE 2. *A patient treated in hospital for chlorosis and gastric ulcer is discharged apparently well, but returns in three days with a perforation; laparotomy twenty-four hours afterwards; complete recovery; health and digestion still apparently good ten months after operation.*—The patient, a girl, aged seventeen years, was admitted into the West London Hospital on March 31, 1901, with the following history. She had been discharged from a medical ward only three days before, where she had been treated by milk diet, rest, iron, aloin, and sulphate of magnesia, for chlorosis with possibly gastric ulcer. The brief notes recorded ‘uninterrupted improvement; abdominal tenderness disappeared.’ The notes on the blood during this stay were: ‘hæmoglobin, 45 per cent.; red cells, 3,490,000; white cells, 7000.’ The patient had never vomited up to that time, but had had pain in the stomach after food for seven weeks. On March 30, after taking a light tea, she went out. Two doors from home, being seized with a violent pain in the left side (gastrosplenic region) and with difficulty in breathing, she returned home and went to bed. She shivered and felt cold. Mr. J. Hepburn gave her a small dose of opium. She slept and ‘felt better the next morning.’ She lived opposite to the hospital, and Dr. Otto F. F. Grünbaum went over to see her at 3.30 P.M. the next day. She would not then acknowledge any abdominal tenderness, but her respirations were rapid, of the so-called hysterical type, her pulse was 104, of good volume and tension, and the liver dulness was diminished in intensity, its lower limit being one or two centimetres above the costal margin. The abdomen, though not distended, ‘felt firm. In the left flank there was some dulness, its anterior margin varying with

the position of the patient. She was taken into hospital. 'Some collapse'(?). The temperature was 98.4° F. and the pulse was 108. Taking these facts and the history into consideration, Dr. Grünbaum diagnosed perforation of a gastric ulcer. At 5.30 P.M. the breathing was more rapid, the pulse was 110 and not of such good volume as before, and the temperature was 102° . At 6.30 P.M. laparotomy was performed.

Operation.—Dr. Grünbaum gave an anæsthetic—gas and air, and later oxygen, with occasionally 'a few whiffs of ether as a stimulant.' A median incision was made above the umbilicus. A few bubbles of inodorous gas or air escaped. There was great distension of both the stomach and the colon, especially of the latter, so great as to necessitate puncture of both in order to make room for further procedures. On passing the fingers between the anterior wall of the stomach and the liver sero-purulent fluid escaped. The anterior wall of the stomach, all along the lesser curvature, from near the pylorus to as far as the œsophageal opening and for a breadth of several inches, was plastered over with recent lymph and had evidently been loosely adherent to the liver, encapsulating the fluid which I had just let out. The perforation was not seen; it was probably hidden beneath the lymph, which it was not thought advisable to disturb roughly. However, all these parts were carefully swabbed and cleansed and a thin iodoform-gauze drain or tampon was spread out a little and passed well back, so as to cover the lymph-coated area. A suprapubic incision was then made; pus was found in the pelvis and that cavity was carefully swabbed out. Serous or sero-purulent fluid was found in the left flank, but not in the right flank. Three rubber drains, each about as thick as the little finger, were placed in the pelvis, and through two special lateral incisions in the splenic and right hepatic fossæ of the peritoneum respectively. The right was removed in three days, and the others were gradually shortened in a few days more. Feeding by the mouth was not commenced till the twelfth day, but the convalescence was uninterrupted. The gastro-hepatic gauze tampon was removed every two days, several times, on each occasion being replaced by a smaller piece. The tubes were removed and shortened at the same time. On the sixth day the nutrient enemata were returned and the bowels acted in the bed. A pint of hot water was henceforth injected into the rectum an hour before each nutrient enema. All the water was retained. The temperature, which was 102° on admission, was 101.4° at 6 P.M. the day after operation, and it sank quickly to normal, where it remained after the fifth day. The patient remained for ten months afterwards free from indigestion or other gastric troubles, but still rather

anæmic. (The notes are by Dr. O. Inchley.) A year afterwards there was a recurrence of pain and 'indigestion,' which was cured by lavage. She is now well.

CASE 3. *Perforation of gastric ulcer; operation twenty-six hours afterwards; recovery.*—The patient, a lady, aged twenty-one years, was seen by Dr. D. Fairweather of Wood Green on December 26, 1901. He immediately sent for Dr. C. O. Hawthorne and a surgeon, and after a consultation between those gentlemen, Dr. R. S. Dickson, Mr. E. J. Eedle, and myself, operation was performed without delay. The perforation had occurred more than twenty-four hours before. The whole of the lesser cavity of the peritoneum was full of thick lymph patches and fluid, the right flank and the pelvis were full of sero-purulent fluid and a little lymph, and there was one patch of lymph on the anterior wall of the stomach. After careful swabbing four iodoform-gauze drains (above liver, down to right kidney, in front of and behind stomach), and one long rubber drain (pelvic) were inserted. Two incisions—epigastric and hypogastric—were made. Recovery was uneventful, and the patient is now well (a year after operation). This case will be published in full.

CASE 4. *Perforation of a gastric ulcer; operation twenty-six hours afterwards; recovery*—The patient, a young woman, aged twenty-four years, was admitted into the Chislehurst and Cray Valley Cottage Hospital on the morning of January 22, 1902, under the care of Mr. Hugh Lawson, and was operated upon on the same afternoon, with his assistance and that of Dr. T. M. Callender, more than twenty-four hours after perforation. This case resembled greatly the preceding one, except that the perforation was in the anterior wall, near the lesser curvature, and a little towards the cardiac end. It was closed by two rows of fine silk Halsted's sutures. Swabbing was employed, followed by gauze drains, &c., as in the preceding case. The course of the case was uneventful. The patient is now (six weeks after operation) up and on solid food, and is free from pain. This case also will be published at greater length. This patient continued well for six months, when she began to suffer from epigastric pains. Diet and lavage quite failed to relieve them. So ten weeks ago I operated again and separated a number of adhesions. I could find no trace of the old perforation except a minute thickening, not hard, and probably covering a suture. She has been free from pain since, but of course the time is too short to judge of the final results.

Cases 5 and 6, which have occurred since this paper appeared in 'The Lancet,' are described in the supplement.

CASE 7. *Perforation of a gastric ulcer; peritonitis; operation on the fifth day; afterwards perforation of a second ulcer; parotitis; perihepatic abscess; pleurisy; death on the thirteenth day.*—The patient, a female, aged twenty-three years, was admitted to hospital on the medical side on December 2, 1899, complaining of abdominal pain. On the previous night she had been attacked with severe pain in the left side of the abdomen, and she vomited a little brandy which was given. She was sent to bed. She had had dyspepsia off and on for some years, but never vomited blood. Next day (December 3) the patient did not look ill, except that she was anæmic. There was tenderness in the epigastrium in the middle line. The abdomen was not distended and it moved well. The tongue was clean. The temperature, which on the previous day had been 101·4° F., was on this day 101° in the evening and on the 4th it was 99·8°. But on these two days the patient was getting worse. The abdomen was more distended and tympanitic. The tongue was dry and the pain was worse. The bowels had not been opened since admission. On December 5 Mr. Keetley was asked to see the case and he operated at once.

Operation.—There was a large escape of gas on opening the peritoneal cavity. A small perforation was found in the anterior wall of the stomach, which was covered by a good deal of lymph. The lower margin of the great omentum was adherent to the anterior abdominal wall in such a way as to have apparently cut off and protected the pelvis and small intestine from infection, the peritoneum above being covered with lymph. The ulcer was excised and closed by sutures, perforating all coats and tied with the knots inside (through a small incision made on purpose close by and afterwards itself closed). The right flank over the kidney and under the liver was examined with a sponge, but no fluid was found. A thin layer of iodoform gauze was placed on the sutured stomach surface and, with a rubber drain, brought out of the wound. Nutrient enemata were ordered. On the day after the operation (December 6) the gauze was removed. As the skin sutures looked tense some were removed and boric acid fomentations were applied. On the 7th the pulse was rapid. Milk was taken by the mouth as well as by the rectum. The tongue was very dry and cracked. On the 8th the bowels were moved six times through the night (the first motions since before the perforation occurred). The nutrient enemata were stopped and an enema of starch and five grains of Dover's powder was given. 'Dressed to-day and condition of abdomen good.' On the 12th the patient had developed parotitis on the right side. The mouth was being frequently cleaned with glycerine of borax. The general condition was worse, but there was no pain or tenderness in the abdomen. There was a dirty discharge

from the wound, seeming to contain bile. There was pain on the right side ; a friction rub was heard. There was some dulness at the right base. A subphrenic abscess was suspected, but the patient's condition seemed to be too bad for any operation. The pulse was 140, the respirations were 48, and the temperature was 102°. The patient died on the 13th.

Post-mortem Examination.—There were an abscess around the right lobe of the liver and *a second perforation of the anterior wall of the stomach.* There was pus in Douglas's pouch. The intestinal coils on the right side of the abdomen were infected and there was a good deal of lymph between them. In the left flank they were free from peritonitis. That part of the anterior wall of the stomach which was the site of the two perforations was bathed with dirty-looking discharge and covered with lymph. Both openings leaked, and the one which was sewed up at the operation had sloughing edges.

Remarks.—When two days before death a dirty, bilious-looking discharge was observed in the wound, I ought immediately to have opened it up and searched for the cause. I was held back by one of the two reasons which prevented me from searching for a subphrenic abscess—viz. the bad general condition of the patient, who was unfit to take a general anæsthetic or to go through what might prove to be an extensive operation under local anæsthesia. The second perforation certainly took place after the operation, because all that part of the stomach wall in which it occurred was well seen and examined. I think the leakage from it led to the fatal termination by polluting the whole wound and perhaps by percolating down into the right suprarenal fossa. The pus in the pelvis may have been secondary to either the first or the second perforation. It must not be forgotten that this case was not operated on until four days after the first perforation. (The notes are by Dr. Matthews Duncan.)

CASE 8. *A large, ragged perforation of the posterior wall of the stomach; general suppurative peritonitis of both greater and lesser cavities; the patient first seen when moribund on the fifth day; the peritoneal cavity drained and douched with neutral saline solution every two hours; artificial anus (ileum); death thirty-four hours afterwards.*—The patient, a female, aged twenty-three years, was admitted into the West London Hospital on September 26, 1900. The patient was brought into the theatre from outside the hospital in a moribund condition, presenting the appearance of a patient with suppurative peritonitis. The abdomen was as hard as a board. The pulse was 140.

Operation by Mr. Keetley.—The patient was put lightly under ether. An incision was made in the middle line three inches long from the umbilicus down, with two sweeps of the knife. There was no bleeding

only a slight oozing at the venous points. A tube of rubber was put deep down into the pelvis. On either side, at the most dependent part between the ribs and the iliac crest, a like incision was made. From the flanks to the hypogastric wound large drainage-tubes were pulled through by large Spencer Wells forceps till they emerged at both ends. A fourth incision was now made at McBurney's point through which a loop of ileum was drawn, opened, and the edges then sutured to wood-wool pads. The peritoneal cavity was then irrigated with five pints of warm neutral saline solution and the patient was removed to a ward. She was put on milk, soda-water, barley-water, or beef-tea, two ounces hourly, gradually increased to three ounces. There was no vomiting after the operation, and flatus was passed both through the artificial anus and the rectum. At intervals of two hours three pints of warm saline solution were irrigated through the drainage-tubes and the dressings were changed. There was no improvement in the pulse, the temperature (about 102°), or the respiration. At 12.30 P.M. the patient started singing for a short time. After that she became rapidly worse, breathing more rapidly, with the pulse running and uncountable. This was thirty-three hours after operation. The temperature rose to 106.2° , and after death, at 1.30 A.M., to 107.3° .

Post-mortem Examination.—The abdominal cavity was filled with foul and purulent fluid. The liver and stomach were covered with the material. Other organs had been partially cleaned by the irrigation. The perforation, which was found on the posterior surface of the stomach, near the lesser curvature and nearer the pylorus than the cardiac end, was of the size of a halfpenny, with thick edges. There was a large amount of shreddy material attached to the under side of the diaphragm, just opposite to the corresponding site of the ulcer. There were pleural adhesions over the lower surface of the left lung.

Remarks.—This patient's acute troubles had begun four days before she was seen by me. After warning her friends of the practical hopelessness of the case, I had her removed at once to the hospital and I operated as above. She was quite unfit to stand any search for the cause of the peritonitis. The drainage, the douching, and the artificial anus relieved the patient for the time, and *might* have saved her had not the mischief been so great around the liver and in the lesser peritoneal cavity, and the perforation so large. This is a type of cases which occur every day and are sacrificed by not calling in the surgeon at the first to clear up the diagnosis. It should be contrasted with Cases 1 to 6. It was a mistake to feed the patient by the mouth, but we were tempted to do it

by her depressed state and by the readiness with which she took and retained liquids. (The notes are by Dr. J. Chatto.)

CASE 9. *Perforation (?) and hæmorrhage; rest and rectal feeding; improvement for ten days: then death from sudden and severe hæmorrhage.*—The patient, a married woman, aged twenty-eight years, was under the care of Dr. C. F. L. Dixon, of Brentford. She had been treated for dyspepsia for some time. After retiring late on April 6, 1900, she awoke with ‘agonising pain’ in the abdomen and great collapse. She rallied from this, but as the pain and tenderness continued Dr. Dixon got me to see her the next day. We had her removed to the Brentford Cottage Hospital, but eventually refrained from operation, partly on account of her own unwillingness, partly because she steadily improved, and because also the symptoms suggested at the worst a strictly localised peritonitis. There was no abdominal or thoracic dulness, only moderate distension and no vomiting. The facial expression became good and the patient became cheerful. She was fed strictly per rectum with three ounces of peptonised milk, strengthened by plasmon, every four hours. Hot fomentations were applied to the left side of the abdomen, where the pain was localised. She seemed to be improving for ten days. She then ‘had severe hæmorrhage per rectum and died soon after, conscious to the very end,’ at 11.40 P.M. on April 16. There was no post-mortem examination, but there can be little or no doubt that this was a case of perforation of a gastric ulcer occurring while the patient was lying in bed with a nearly empty stomach, and causing a strictly localised adhesive peritonitis with little or no extravasation. No signs of abscess or of fluid in any part of the abdomen or the thorax were found in spite of repeated examination, and there is a possibility that the perforation may have been duodenal and altogether extra-peritoneal. Doubtless some large vessel was opened either by progressive ulceration or by sloughing, and the patient died, as above related, with copious hæmorrhage from the rectum.¹ (The notes are by the matron of the Brentford Hospital. The temperature chart was accidentally destroyed.) This case should be compared with W. Furner’s case 2, ‘Lancet,’ December 31, 1898.

¹ This case ought to have been published with the four cases of severe hæmorrhage in the *Lancet* of June 8, 1901, p. 1597; but it was forgotten, doubtless because it was not operated upon. With a case under the care of Dr. J. Allan of Chislehurst and myself, it makes a total of six *severe* gastric (or duodenal) hæmorrhage cases seen by me in the last two or three years, of which three were not operated upon and in these the patients died, while all the three patients operated on recovered.

As this record of my experience of non-malignant gastric cases seen in the last four years is meant to be complete, the following case should be mentioned.

CASE 10. *Perforation with the stomach probably empty; refusal of operation by the patient; medical treatment; death ultimately, with signs of subphrenic abscess and left pleuro-pneumonia.*—A single woman, about thirty years old, was seen by me about three years ago. She had suffered for some time from chronic indigestion. Soon after the preceding midnight she had been seized with great pain in the abdomen and had collapsed. She had had no food since tea-time, about seven or eight hours previously. After a time she rallied, but before the breakfast hour she became worse and collapsed again. A medical man was fetched, who placed her under my care. I saw her some hours afterwards. She had then rallied once more, but she presented symptoms which convinced me that perforation of, fortunately, a probably empty stomach had occurred. I urged her strongly to permit operation, but she obstinately refused. I directed her to be fed wholly per rectum, and thought that the case might come to nothing worse than a subphrenic abscess, by which time she might be willing to submit to surgical treatment. She ceased to be under my care. In a few days I learned that she seemed so much better that feeding by the mouth was commenced. In a day or two more the temperature began to rise, and she eventually died with signs of subphrenic abscess and pleurisy of the left side, and without surgical intervention.

CASE 11. *Chronic abscess or fistula in the left anterior abdominal wall, traced to beneath the diaphragm, and probably having originated in the perforation of a gastric ulcer. Erosion, &c., and drainage; cure.*—The patient, a single woman, aged thirty years, was admitted into the hospital on October 26, 1896. Five years before she had had an attack which was diagnosed as biliary colic, and she was said to have passed gall-stones. Chronic indigestion and anæmia had been present ever since. A second attack of 'biliary colic' had occurred some months previously. One week after this (June 1896) peritonitis came on, and towards the end of the same month 'some quarts' of pus escaped from an opening at or near the navel. Six weeks previously (September) the discharge had nearly ceased, but what was believed to be rheumatic fever supervened. The fever abated, and about the same time or a little afterwards the abscess burst open again, discharged freely, and had done so ever since. The patient had 'always' suffered from anæmia and at times from 'very severe indigestion and neuralgia.' The personal and family history otherwise was unimportant. On admission the patient was seen to be pale and

thin. The orifice of the umbilical sinus was exceedingly small. There was an area of dulness to the left of and below it. The temperature was normal. The patient was now seen by Dr. Leonard Dobson, who immediately recommended operation and placed her under me.

Operation.—On October 27 I proceeded to operate. A sinus or cavity was traced, extending from two and a half inches to the left of and below the umbilicus, underneath the rectus, up to the lower surface of the diaphragm as far as the fingers would reach beneath the edge of the ribs. It contained granulations and much foul-smelling pus. The left rectus was divided, and after its anterior wall had been freely slit up, the cavity was scraped, swabbed, and douched. Finally, a low counter-opening was made and three rubber drains were inserted, two between the stomach and the diaphragm and one from the umbilicus to the counter-opening.

With regard to the after-history of the case, there was no pain, the wounds gradually completely healed, and the patient put on weight. She was discharged well on February 3, 1897. (The notes are by Mr. Ellacombe.)

CASE 12. History suggestive of old perforation of the stomach; more or less recovered from without operation; but the patient not really well several years afterwards.—I may mention that I have had in the period covered by these hospital cases a private case with Mr. H. Scott Elliott and Mr. F. W. Way of Southsea, in which the history and symptoms pointed to a perforation of a gastric ulcer fourteen months before with localised peritonitis and left pleurisy. The patient cannot be said to be really well yet, although there is nothing now which would quite justify operation. She suffers a great deal from a recurrent skin rash, and has occasionally pain and discomfort in the gastric region. It is now four years since the first onset of gastric symptoms.

CASE 13. Gunshot (revolver) perforation of the liver and stomach in an infant suffering from rickets and whooping-cough; a sloughing burn on the heel; laparotomy; death on the eighth day.—The patient, an infant, aged fourteen months, was admitted into the hospital at 9.45 A.M. on May 5, 1901. At 8.30 A.M. his mother, playing with him, accidentally shot him through the abdomen with a revolver, placed close to him. The bullet was found in the bed by Mr. Herbert W. Chambers, who cleaned and dressed the wounds and sent the child into the hospital at once. The child was admitted crying and slightly collapsed. The pulse was 168, the temperature was 96.2° F., and the respirations were 40. He was markedly rachitic and had whooping-cough. The collapse increased, and was combated by various usual means, including oxygen inhalation. There were two abdominal wounds, one in the middle line below the apex

of the ensiform cartilage, and small, the other large and ragged and in the middle of the left flank. This was plugged with a piece of omentum of the size of a florin. At 11 A.M. the patient vomited blood.

Operation.—At 11 A.M. on the day of admission operation was proceeded with. Just sufficient anæsthetic (A.C.E.) was given to allow the abdomen to be opened. The child was placed upon two rubber warm-water bottles and his legs were well wrapped in wool. The surface of the abdomen was cleaned and sterilised. A four-inch incision parallel with the left costal margin and starting from the aperture of the entrance was made. There was blood in the peritoneum, and a perforation of the liver (left lobe) was still oozing. This was now temporarily plugged with cyanide gauze. The stomach was brought freely into the wound. It showed a small perforation anteriorly, near the pylorus, and a large one of the size of a shilling and very ragged posteriorly, close to the spleen and greater curvature. The omentum was severely bruised, but it showed no visible wound. The gastric wounds were each closed by two rows of Lembert's sutures. The stomach was almost empty, and nothing which could be distinctly identified as food could be seen in the peritoneal cavity, but I think that there was an appearance as of a little mucus and half-digested milk mixed with the blood found and removed. The prolapsed omentum reduced itself and was carefully cleaned. Counter-openings having been made in the splenic and suprapubic regions, large drainage-tubes were temporarily inserted and the whole peritoneal cavity was douched with hot sterilised neutral saline solution. The peritoneal wound was closed with fine silk, and the muscle and skin were sutured with silkworm gut. The operation lasted just under forty-five minutes. An enema of four ounces of peptonised milk was given, and the child was put back to bed and well warmed with water-bags. The pulse was 160. At 1.30 P.M. the pulse was 144. The child was warmer and presented a better colour. At 2.30 and at 4.30 P.M. the patient was 'doing very well;' the pulse was 130. At 11 P.M. the respirations were 44 and the temperature was 100°. The child was very restless, but otherwise he was better. On the 6th the patient was restless, but he slept at intervals. The temperature rose to 101·2°, the pulse was 132, and the respirations were 40. The temperature soon sank again to 97·6°. Some 'trembling fits' now occurred. Two drachms of milk were administered every hour by the mouth. On the 7th the patient was less restless, there was no vomiting, and he appeared to be comfortable. The temperature was 99°, the pulse was 136, and the respirations were 42. At night the respirations were only 32. The child seemed to be cold and was wrapped in cotton-wool. Whooping-cough returned in the afternoon. On the 8th the

patient had had no sleep. The temperatures were 100.2° , 99.2° , and 99.6° , the pulse was 124, and the respirations were 28. The abdomen was soft and not tender. Milk was taken with avidity. On the 9th the patient had passed a quiet night, but had had no sleep. The bowels were opened, a partly-formed motion being passed. There were a bad cough and occasional whooping. The temperature was 98.6° , the pulse was 132, and the respirations were 30. The shoulders were raised on a pillow. Another stool—dark and containing a blood-clot—was passed. A nutrient enema which had been administered at five o'clock was returned. After a wash out other enemata were retained. A large blister was discovered on the right heel, probably caused by hot-water bottles, with which he had been carefully warmed since his admission. Great care had generally been taken to wrap them thickly in flannel, but the child's restlessness may have counteracted this. On the 10th a little sleep was gained at intervals. The bowels were opened twice. There was no more blood. There had been no vomiting since the operation. The temperature went up to 102° at 2 A.M.; at 6 A.M. it was 99.4° , the pulse was 128, and the respirations were 32. At 2 P.M. the temperature was 102.2° and the pulse was 154. No coughing had taken place so far on this day. The blister was opened on the heel and the slough was incised beneath. Boric fomentations were employed. On the 11th the patient had slept a good deal, but the temperature at 2.30 A.M. had been 104.2° , the respirations 56, and the pulse 140. The child was quiet and he looked as usual, except that he was a little paler. At 6 A.M. the temperature was 101.4° ; at 12 noon, it was 103.6° , the pulse was 138, and the respirations were 34. At 1.30 P.M. a convulsion occurred. The temperature was 102.8° , the pulse was 160, and the respirations were 52. The convulsions and the rises of temperature were repeated at intervals during the day several times. After 3 P.M. these did not occur. On the 12th the patient was quiet till 7.30 A.M. But then the respirations began to be frequent, and at 9 A.M. they were 64, the temperature being 99.6° , and the pulse 132. There were now slight 'trembling attacks' and squints were observed. Oxygen inhalations improved the breathing. The abdomen was soft and was moving well. At 10.13 A.M. the child became unconscious, and soon afterwards, at 10.50 A.M., he died.

Necropsy.—The organs of the head and chest were normal, except the lungs, which were slightly congested at the base, and the bronchi were rather catarrhal. Examination of the abdomen showed that the intestines were healthy and there was no general peritonitis. The gastric wounds were healthy-looking. There was no leakage. The left lobe of the liver was perforated one and a half inches above and slightly to the left of the

notch. The liver otherwise was normal. The whole of the omentum was gathered up into a thick bunch, matted closely to the greater curvature and adjacent part of the anterior wall of the stomach, and adherent at the ends also, to the liver and the spleen respectively. The transverse colon was drawn up close to the lower border of the matted omentum. In the interior of this bunched omentum and in a small cavity of the size of a florin, apparently formed by the adhesion of the omentum to the stomach, was a thin layer of greenish purulent lymph. All the other organs and regions of the abdomen were normal. The slough in the right heel extended down to the bone. (The notes are by Dr H. H. Stiff.)

CASE 14. *Five years' history of gastric troubles; repeated treatment by rest and rectal feeding followed by relapses; subphrenic abscess drained and cured; slight attacks of hæmatemesis frequently repeated; very depressed condition; gastro-jejunosomy; death.*—The patient, an unmarried woman, aged twenty-eight years, unhealthy and depressed-looking, anæmic, and with much acne on the face, was admitted on February 18, under the care of a medical colleague, suffering from tenderness in the epigastrium. There was a long history (five years) of pain immediately after food, which was relieved by vomiting. Three years previously an abscess appeared below the lower border of the ribs on the left side, and it was drained with tubes in the Windsor Hospital. The patient had been several times subjected in hospital to a six-weeks' course of rectal feeding (once to an eight-weeks' course). On each occasion she was relieved for from seven to nine months. She had vomited blood first six weeks previously and six times since, on one occasion half a pint. There was habitual constipation. The periods were scanty and irregular. She was now fed (per rectum chiefly) for thirty-seven days on peptonised milk, beef-tea, barley-water, and occasionally a little brandy and soda-water, also a quarter of a grain of opium three times a day. During all this time she vomited nearly every day, often several times; one day ten times. The vomit was, as a rule, blood-stained. There was a good deal of pain. The temperature was usually normal; once it went up to 100° F. About ten days before the end of this period I was asked to see her: but I felt reluctant to operate owing to the depressed and unhealthy-looking appearance of the patient, which differed considerably from the aspect of a person suffering only from gastric ulcer and its usual consequences. However, on March 27 it seemed that something surgical must be done, as the patient continued to be in pain and to vomit daily as much as ever.

Operation.—An anterior-gastro-jejunosomy was performed. The

note says : 'Stomach small. Veins were varicose or dilated as if some portal obstruction. No ulcer or thickening or adhesion felt.' On opening the abdomen I found the transverse colon distended with solid fæces in large lumps to such a degree as to prove to be a mechanical obstruction to the proceedings of the operation, and possibly afterwards to the passage of the contents of the jejunum when a loop of that bowel was brought over and fixed to the stomach.¹ And, further, contrary to my usual custom, I sutured the mucous membrane of the stomach to that of the intestine with a continuous (glover's) suture. To these two factors (one or both) I am inclined to attribute the unfortunate course of the case—vomiting for two days, followed by collapse and death.

Post-mortem Examination.—An abscess was found between the layers of the stomach wall (an 'intramural abscess') around the gastro-enterostomy wound, and spreading from the same centre a localised, adhesive, but probably septic peritonitis in the adjacent part of the abdomen. The anastomosis is vividly described as 'looking tight and admirable.' The entire colon was full of dry formed fæces—packed. The sequence of events was, I think, as follows. The gastro-enterostomy wound was, like all or nearly all other gastro-enterostomy wounds, not absolutely aseptic, because the stomach cannot be perfectly asepticised. But the close glover's suture of the mucous membrane prevented it from draining either into the stomach or the intestine. A collection of bloody serum formed in the stomach wall. Matters were aggravated by the want of rest caused by the constant vomiting, and the vomiting itself was kept up by the suppuration, and possibly also by mechanical obstruction of the jejunum due to the colon being distended with fæces. No ulcer was found *post mortem* in spite of a careful search by several observers. Perhaps free purging and even a colotomy would have done this patient more good, not only than gastro-enterostomy, but also than opium and rectal feeding. (The notes are by Dr. M. V. Dee.)

CASE 15. *Severe recurrent hæmatemesis; gastro-enterostomy with Murphy's button; recovery.*—The patient was a middle-aged woman, a patient of Dr. James Allan of Chislehurst, the subject of severe recurrent hæmatemesis. With the help of Dr. Allan and of Mr. A. S. St. John (anæsthetising) gastro-enterostomy was performed on September 6, 1901, with Murphy's button. The Murphy's button was passed per anum, and the patient writes (six months after operation) : 'I shall come and see you, and then you will see how well I look.'

¹ The entire colon and rectum were found to be packed with fæces *post mortem*.

CASE 16. This was a case of an old history of gastric ulcer and of very severe hæmatemesis years before, of chronic dilatation of the stomach, and of *tetany*. Dr. Gilbert Richardson, when called in, saw that nothing but surgery could help the patient. However, death took place before the surgeon could arrive. It was recorded briefly in the 'Lancet' of June 22, 1901, p. 1789.

CASE 17. *Five years' history of gastric trouble suggesting ulcer; repeated treatment by rest and rectal feeding; temporary benefit; relapse; gastro-enterostomy; retention of the button: its removal by gastrostomy; cure up to date.*—The patient, a girl, aged fifteen years, was admitted on December 7, 1900. She was anæmic but was well nourished. She had first suffered from pain in the stomach five years previously. She was put to bed for one month, was kept on milk diet, and she got quite well and remained so for a month. Then a relapse was treated in the same way, and the cure lasted for a year. She went into service one year previously to admission. After a time the abdominal pain and vomiting recurred. In August, 1900, she was admitted on the medical side of the hospital and was treated for 'gastric ulcer,' by rectal feeding for eighteen days and was discharged after another week on 'half diet'; 'free from all pain since the fourth day after admission.' After another month's domestic service she had her first menstrual period, but her second only a week previously to admission. When admitted she appeared to be well nourished, but rather anæmic. She had no appetite, and the sight of food caused nausea. Pain came on in the epigastric region immediately after food and lasted for several hours. She had only once raised blood, then she 'coughed up a small clot about the size of a finger-nail.' Tenderness was marked at two points, both in a line drawn upwards and outwards from the umbilicus, one just under the edge of the ribs and the other midway between the ribs and the umbilicus. On liquid diet the patient lost her pain, but when a fortnight after admission she was allowed solids the pain returned severely.

Operation.—The operation, which was performed on January 1, 1901, comprised a median epigastric incision and an anterior gastro-enterostomy with Murphy's button, the jejunum being open twenty inches from its proximal end. The pylorus was thickened and was one inch to the right of the middle line. The mucous membrane of the stomach was bright red in colour. No search was made for an ulcer except in the part of the stomach which easily presented itself. There, none could be felt from without. The desire was to make the operation as simple and uncomplicated as possible. On January 2, during the night there was altered blood in the vomit. Sips of hot water were allowed by the mouth.

From then no more vomiting occurred, and after the fourth day no pain until the patient was allowed to get up on the 29th. Afterwards pain and tenderness were felt in the epigastrium. The presence of the button in the stomach was suspected. A skiagram was taken, but it showed nothing. Ultimately the shadow of the button was plainly seen on the screen, and it was removed by gastrostomy. It was found to be still fixed in the gastro-enterostomy opening.

Removal of the button, May 7.—An aperture was made in the anterior stomach-wall and the gastric half of the button was unscrewed and taken out. The jejunal half could only be extracted by a good deal of manipulation, assisted by notching the opening. The process of extraction left the wall of the gastro-enterostomy opening so thin on one side that a few Lembert's sutures were inserted to back it up. The first aperture was mostly closed by three sutures penetrating all the gastric coats and tied with the knots inside the stomach. The rest was closed by Halsted's suture. The cause of the retention of the button was probably its not having been screwed up quite tight enough. (The notes are by Mr. Stiff.)

The patient was seen recently, and she described herself as feeling quite well. She looked bright, though she was still rather anæmic.¹

Three cases of hydrochloric-acid poisoning.—These cases form the subject of a paper read before the Royal Medical and Chirurgical Society and published in the 'Lancet' of November 17, 1901, p. 1328. Two were suicidal and both of the patients died, one because the case was too advanced for operation, and one from progressive ulceration of the œsophagus and gangrene of the lung, about six weeks after I had performed a gastro-enterostomy, which relieved her for a time. The third patient made an admirable recovery after Loreta's operation, which removed intense emaciation and other disagreeable and dangerous symptoms due to an enormously dilated stomach. I am convinced that the safety of such cases lies in very early operation, combined with special treatment described in the paper referred to.

The above twenty-four gastric cases include all that I

¹ This patient had a relapse in August, 1902, which was quickly cured by lavage, which she learnt to perform herself. Now (December) she is quite well.

have been consulted on *for non-malignant gastric troubles* in the past four years and *one malignant* case which I have added in the Supplement, because perforation occurred. Gastric symptoms have also been present in cases in which there were adhesions of the omentum, &c., secondary to hernia, or to inflammatory affections of the gall-bladder, or of the pelvic organs. In these cases the prime disease has been treated operatively with success. Incidentally I have seen a few patients with symptoms of gastric ulcer who came to me with lateral curvature of the spine. In these spinal cases the indications for treatment of the stomach seemed to be purely medical and hygienic, combined with attention to the spinal curvature.

SUPPLEMENT

Perforating ulcer of the duodenum; operation; recovery (Dr. Andrew Elliot's case).—This is one of the few cases in which a perforation of the duodenum has been diagnosed before operation, and then successfully operated on. The diagnosis was made by my friend and colleague Dr. Andrew Elliot. A man aged twenty, who had been attended by Dr. Elliot for indigestion, was suddenly seized (on June 4 last) with severe pain in the epigastrium, collapse and vomiting. The vomit contained no blood. There were tenderness, retraction of the abdomen, and diminished liver dulness. The centre of tenderness was rather to the right than to the left of the middle line. *Operation* (as soon as could be arranged for) a few hours afterwards. Perforation was easily found, but with difficulty brought into reach: a very stiff-based ulcer had given way. A purse-string suture was passed round, through healthy duodenal wall—then the whole grafted with a flap of the edge of the lesser omentum. Much bile and mucus in the sub-hepatic, the right renal, and in the pelvic regions. Swabbing, gauze drains. Starvation for eight days, except hot water and rectal enemata. Highest temperature after operation 99°. Temperature between perforation and operation 101.2°. Patient keeps well (September 1902). This case will be more fully reported.

Case of perforation of carcinomatous gastric ulcer; operation; convalescent seven weeks after operation; then Maydl's jejunostomy for pyloric obstruction, &c.; death.—Emma P., aged twenty-nine, was taken into the West London Hospital, October 28, 1902. She had been an out-patient under treatment for chronic indigestion with slight attacks of hæmatemesis or of hæmoptysis. A swelling appeared in the epigastrium whenever she swallowed a glass of cold milk. Dr. Saunders diagnosed pyloric obstruction, and urged her to come into hospital; but she refused. A fortnight afterwards she was brought there in a state of collapse three hours after being seized with violent pain in the epigastrium. She now lay on her back with the upper part of the abdomen somewhat retracted, the flanks dull, the whole abdomen rigid, very tender, and not moving freely with respiration. The lower margin of liver dulness scarcely reached down to within $1\frac{1}{2}$ inches of the costal margin.

At a consultation between Dr. Saunders and Mr. Keetley immediate operation was decided upon. The operation and after-treatment were similar to those in Case 3 (Miss W. R.), except that Weir's plan, of dividing the sheath of the rectus and only retracting the fibres of that muscle, was followed and answered well.

But the condition found was different and very remarkable. As in the case of W. R., a large quantity of opaque fluid was found both beneath the liver and in the pelvis. It was thoroughly swabbed away. The stomach was contracted, very hard and thick walled, and stiffened almost to rigidity by solid infiltration in and around chains of large glands along both greater and lesser curvatures. The lesser omentum, and other peritoneal gastric 'ligaments,' were too thick and stiff to permit the stomach to be pulled towards the wound for examination. Fluid kept welling up from near the cardiac end until the stomach was obviously quite empty. But no perforation was discovered; the rigidity of the viscus made it impossible to reach with the finger any part but the pyloric half without further enlarging the incision. Mr. Keetley thought such enlargement needless. He spread out on the whole anterior surface a thick sheet of gauze, satisfied himself that it acted as an effective packing and drain, and then finished the operation (as in

Case 3 above. The pain was completely relieved by the operation without opium. Temperature about normal throughout after-treatment, except one rise to 100° ; no pain, only hunger.

The Anæsthesia.—Owing to the patient's semi-collapsed condition only a minimum of general anæsthetic was used, assisted by eucaïne for the parietal incision. Patient showed marked signs of consciousness, and behaved in a way to suggest to the bystander that she was in great pain. For half an hour after the operation she screamed at every expiration, and then declared, I have no doubt truly, that she had felt no pain whatever since just before the operation began.

The wound healed and she convalesced quickly; but at the end of the seventh week symptoms of pyloric obstruction, as well as a rise of temperature, made an exploratory laparotomy and a jejunostomy necessary. Death followed in a few days.

Post-mortem.—The stomach, wholly covered by the ribs and their cartilages, could only be separated from the liver, diaphragm, and pancreas by the knife. A very thick, apparently scirrhus, carcinoma extended along the lesser curvature from the œsophagus to the pylorus, and had drawn a large part of the rest of the stomach into itself, and also infiltrated the adherent part of the pancreas. Stomach and pancreas together formed a large, hard, solid mass.

The immediate cause of death was apparently adhesive peritonitis, extending from the jejunostomy and matting a number of coils of small intestine together. Two or three patches of lymph were seen, but scarcely any free fluid was found in the peritoneal cavity.

A simple jejunostomy, such as that recommended by Furner in the 'Lancet' for December 31, 1898, would have been better than Maydl's operation for such a case as this.

I think the original perforation had probably been a small rent of the thin part of the stomach wall *near* the part which was infiltrated and adherent to the pancreas. A puckered and funnel-shaped depression was seen, at the time of the post-mortem examination adherent to the pancreas.

